REMARKS

Claims 1-5, 7, 8, 20-24, 26-28, and 30-36 are of record pending in this case. No claims are hereby amended, no claims are cancelled, and no claims are added. Claim 4 was previously withdrawn from consideration. Claims 1-5, 7, 8, 20-24, 26-28, and 30-36 are pending and claims 1-3, 5, 7, 8, 20-24, 26-28, and 30-36 remain in issue in this case.

Applicants respectfully submit that the claims as set forth herein are directed to allowable subject matter. Reconsideration and withdrawal of the outstanding objection(s) and rejection(s) and allowance of the pending claims is respectfully requested.

* * *

Re: Rejection of claims 7, 20-24 and 26-28 under 35 U.S.C. §112, first paragraph.

Claims 7, 20-24 and 26-28 stand rejected as unpatentable under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the enablement requirement.

Legal Standard For Rejecting Claims
Under 35 U.S.C. §112, first paragraph

The legal standard for determining whether the disclosure provides a sufficient description of the invention is whether a person reasonably skilled in the art could make or use the invention without undue experimentation based on the disclosure and on information known in the art. *United States v. Telectronics, Inc.*, 857 F.2d 778, 8 USPQ2d 1217 (Fed. Cir. 1988). As an initial point, the law does not require, and indeed prefers, that a patent specification omit that which is well-known. *In re Buchner*, 929 F.2d 660, 18 USPQ2d 1331 (Fed. Cir. 1991). Further, if experimentation is required by the artisan to perfect practice of the invention, it may be that that experimentation may be complex, however, this fact does not necessarily make it undue if the art typically engages in such experimentation. *In re Wands*, 858 F.2d 731, 8 USPQ2d 1400 (Fed. Cir. 1988). That is, the test of enablement is not whether any experimentation is required, but

whether, if experimentation is necessary, it is undue. *In re Angstadt*, 537 F.2d 498, 190 USPQ 214 (CCPA 1976).

The factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue" include, but are not limited to: The breadth of the claims; the nature of the invention; the state of the prior art; the level of one ordinary skill; the level of predictability in the art; the amount of direction provided by the inventor; the existence of working examples; and the quantity of experimentation needed to make or use the invention based on the content of the disclosure. See, for example, MPEP 2164.01(a). It is improper to conclude that a disclosure is not enabling based on an analysis of only one of the above factors while ignoring one or more of the others. MPEP 2164.01(a).

With regard to the burden of proof required to support a rejection under Section 112, the Patent Office is required to presume that the specification complies with the enablement provision of Section 112 unless it has acceptable evidence or reasoning to suggest otherwise. See, for example, *In re Marzocchi*, 439 F.2d 220, 169 USPQ 367 (CCPA 1979). The Patent Office thus must provide reasons, supported by the record as a whole, why the specification is not enabling. Then and only then does the burden shift to the applicant to show that one of ordinary skill in the art could have practiced the claimed invention without undue experimentation. *Gould v. Mossinghoff*, 229 USPQ 1 (D.D.C. 1985), *aff'd in part, vacated in part, and remanded sub. nom., Gould v. Quigg*, 822 F.2d 1074, 3 USPQ2d 1302 (Fed. Cir. 1987). Mere conclusionary statements as to the level of ordinary skill in the art are not a sufficient basis for a rejection under 35 U.S.C. §112. *In re Brebner*, 455 F.2d 1402, 173 USPQ 169 (CCPA 1972). Or, as was stated in the MPEP at section 2164.05:

> The examiner must [] weigh all the evidence before him or her, including the specification and any new evidence supplied by applicant with the evidence and/or sound scientific reasoning previously presented in the rejection and decide whether the claimed invention is enabled. The examiner should **never** make the determination based on personal opinion. The determination should always be based on the weight of all the evidence. MPEP 2164.05 (emphasis in the original).

The Examiner's Rejections

Claims 7, 20-24 and 26-28 stand rejected under Section 112, first paragraph, as containing subject matter that is allegedly not sufficiently described in or enabled by the specification. The examiner's rejections are improper in that the examiner has failed to meet his burden of proof as to why the disclosure is insufficient.

To make these rejections, the examiner has singled-out certain limitations from these claims 7, 20-24 and 26-28. Addressing claims 7 and 20-24 together first; each of these includes "data processing" elements generally. In claim 7, the particular element in question is a "data processing system [which] is operatively associated with [a] photon source," and claims 20-24 involve various algorithms (Doppler broadening, positron lifetime, selective activation and/or three-dimensional imaging, respectively). Each of these elements are directed to the processing of data and/or "operating [the] photon source to produce photons having the predetermined energies," *quoting from* claims 7 and 23.

In response first relative to claim 7, Applicant notes that paragraph 43 of the present specification describes the operative connection of a data processing system to a photon source and that paragraphs 36 and 37 provide further details of the operation of a photon source to produce photons of particular energies. Additionally for the algorithms of claims 20-24, paragraphs 27-30, 40 and 56-61 explain how to perform Doppler-broadening, how to determine positron lifetime, how to produce 3-D images and how to selectively activate certain isotopes or positron emitters.

Moreover, the specification notes in various places that these processing means are well known in the art.

Now, in more detail; again first addressing the data processing system operation of the photon source of claim 7, paragraph 36 of the specification provides basic descriptions of a variety of photon sources which can be used herewith, particularly those suitable to provide the desired selectable photon energies hereby. A specific, commercially available model electron accelerator (Model 6000 linear actuator, from Varian Corp.) is even referenced in one non-

limitative example. Paragraph 43 then explains that the "data processing system 60 [may] control the function and operation of the photon source 12" by, for example, "select[ing] the desired photon energy, [or] activate[ing] and deactivat[ing] the photon source" (Applicant's Application Publication, No. US2003/0043951 A1, page 5, paragraph 0043, lines 3-6). Thus, the specification identifies very specific examples of a photon source (at least one of which by name) and how the data processing system may operate the same. Note, the exemplar photon source already allows for selecting one or more of the various energies and obviously has controls for being alternately activated and deactivated (e.g., turned on and off). The next step of connecting the data processing system 60 thereto and having it provide those selections and activations/deactivations is then described, and enabled in paragraph 43.

Furthermore, the examiner's mere conclusionary statement that such integration is a "'black box' with no description of the internals thereof" (Office Action, page 3, lines 8-9) is contrary to *In re Brebner*, and MPEP 2164.05 as a mere statement of "personal opinion" without support of evidence or scientific reasoning. Until the examiner makes a sufficient showing of evidence or scientific reasoning as to non-enablement, the presumption of enablement stands. *In re Marzocchi, supra.* The *prima facie* case of non-enablement for the data processing system operation of the photon source therefore fails and the rejection hereon should therefore be withdrawn.

It must be noted that no applicant need provide and preferably omits that which is well known in the art. MPEP 2164.01 and *In re Buchner, supra.* Additionally, it should be noted that the challenged "black box" is of exactly the same character as that black box upheld as enabled in *In re Hayes Microcomputer Products Inc Patent Litigation*, 982 F.2d 1527, 1536, 25 USPQ2d 1241, 1247 (Fed. Cir. 1992), where the Federal Circuit addressed a sufficiency of the specification challenge by noting that the "black box" in the drawing there was "sufficient for a skilled artisan to understand the subject matter of the claimed invention." Thus, a sufficiency of a "black box" question is the same as for all other specification section 112 questions; namely, are they sufficient for a skilled artisan to understand the invention? Indeed, the *Ghiron* case cited by the examiner is not to the contrary, but rather supports this view, i.e., if understood by the skilled artisans, then block diagrams describing function only are not fatal as long as the structure is conventional and can be determined without an undue amount of experimentation. *In re Ghiron,*

442 F.2d 985, 991, 169 USPQ 723, 727 (CCPA 1971). Thus, as to the examiner's request, per the examiner's reliance on the *Ghiron* case, that the Applicant provide the Patent Office with literature that explains data processing system operation of a photon source, Applicant respectfully notes that the requirement is satisfied by the specification as-filed. The structures are separately conventional and no undue experimentation is necessary to make them work together in the fashion of the present invention. Again, no evidence or scientific reasoning has been provided to the contrary so the rejection fails.

Next, as to the algorithms brought into question here, the specification notes that they are also known in the art. See specifically, paragraph 57, lines 11-23 (Doppler broadening); paragraph 58, lines 23-29 (positron lifetime); paragraph 60, lines 4-17 (3-D imaging); as well as paragraph 40, lines 14-23 (positron lifetime and 3-D imaging).

Even so, it may more specifically be noted for claim 20 (and claims 21-24 as dependent therefrom) that paragraph 57 of Applicant's specification not only describes the Doppler broadening process itself, but also specifically references, and still moreover incorporates by reference the Akers patent, no. 6,178,218, which discloses in great detail an example of one type of Doppler broadening algorithm that may be utilized in and/or with the present invention. Although reliance upon the specific disclosure as well as the state of the art is itself sufficient for enablement here; the present incorporation by reference nevertheless removes any doubt whatsoever about the enabling disclosure of a Doppler broadening algorithm. Note that the algorithm is set forth in Fig. 2 of the incorporated Akers patent, no. 6,178,218, and the associated Akers specification text starting in column 5 at line 49 and proceeding into column 6, to at least line 9 and continuing more generally to line 32.

Note, this is directly contrary to the examiner's assertion that the Akers patent, no. 6,178,218, does not refer to or mention a "Doppler broadening algorithm." Rather, this is exactly what is described in the Akers patent, no. 6,178,218. Doppler broadening is specifically identified by name (i.e., "Doppler broadening") in column 6, lines 6-8 of the Akers patent. Even so, it is true that the word "algorithm" was not identically used in the Akers patent; however, that fact alone does not diminish the capacity of this above-identified section of the Akers patent, no. 6,178,218, as actually revealing an algorithm. Indeed, the Court of Appeals for the Federal

Circuit has found that "***every step-by-step process,*** be it electronic, chemical, or mechanical, ***involves an 'algorithm'*** in the broad sense of the term." *State Street Bank & Trust Co. v. Signature Financial Group, Inc.,* 149 F.3d 1368, 1374-75, 47 USPQ2d 1596, 1602 (Fed. Cir. 1998), cert. denied, --- U.S. ---, 119 S. Ct. 851 (1999) (emphasis added). Moreover, "mathematical algorithms" (i.e., procedures for solving mathematical problems, using, for example, formulas) were found in *State Street* also to be merely be a special subset of the general category of "algorithms" (mathematical algorithms being, by themselves, nonstatutory subject matter). *See also, In re Iwahashi*, 888 F.2d 1370, 1374, 12 USPQ2d 1908, 1911 (Fed. Cir. 1989).

Merriam-Webster is in accord defining "algorithm" broadly as any "step-by-step procedure for solving a problem or accomplishing an end . . . ." *Webster's Third New International Dictionary, Unabridged*, Merriam-Webster, 2002. http://unabridged.merriam-webster.com (retrieved 16 November 2004).

Thus, the "technique" described in great detail in Akers for "Doppler broadening" is also an algorithm (per *State Street Bank, supra*, and Merriam-Webster, *inter alia*) which fits the usage thereof in claims 20-24 here. As such, that prior description by itself and/or in view of the knowledge of the art, is sufficiently enabling to support the present claims. Thus contrary to the allegations of the examiner in the Office Action, page 4, lines 5-11, there is no need for any further guidance in how to select any particular technique, nor how to transform any such technique into an algorithm (because it already is an algorithm per *State Street Bank, supra*, and Merriam-Webster, *inter alia*), nor how to evaluate any constants in any resulting mathematical formula. The present disclosure, as supplemented by the prior Akers patent, no. 6,178,218, provides all the guidance necessary. Indeed, there is no evidence or scientific reasoning to the contrary. The rejection therefore fails.

The examiner then generally applies the same categorical rejection to the positron lifetime and 3-D imaging algorithms (i.e., that if there are a plurality of such algorithms available, there was allegedly insufficient guidance in "how to select" any particular technique, or "how to transform" any such technique into an algorithm, and/or "how to evaluate any constants" in any resulting mathematical formula).

However, these algorithms are also sufficiently well enabled hereby, whether by the present description or the by reliance on the state of the art, or both.

For example, determination of positron lifetimes is known in the art. The Applicant-cited article by C. Szeles et al., entitled POSITRON-ANNIHILATION SPECTROSCOPY, describes in detail the historical understandings of the positron from its discovery in 1932 through its ultimate use as a tool in the 1960's to the further refinements in the use and understandings thereof by 1997 (the year of publication of that article). Of specific note here, positron lifetime measurement and use was described in detail therein. Thus, Applicant followed the axiom that the law does not require, and indeed prefers, that a patent specification omit that which is well-known. MPEP 2164.01 and *In re Buchner*, 929 F.2d 660, 18 USPQ2d 1331 (Fed. Cir. 1991). Then also, Applicant notes that the fully well established fact that positron lifetime algorithms have been used by skilled artisans for a long number of years, it must also be understood by those artisans how and which algorithms they may desire to use, and how such may be modified, if indeed such is necessary or even desirable. That is, even if experimentation may be necessary, this is what those skilled in the art have regularly undertaken for a large number of years, and such experimentation is thus not "undue." Applicant has not invented a positron lifetime algorithmic improvement; rather a method which makes use of those otherwise available and understood for their conventional purposes. So long as those artisans can make use of conventional algorithms for at least one representative operable embodiment or set of embodiments of the present invention, enablement is achieved. There is no need for Applicant to enable every possible alternative variant to which his invention may be turned. The examiner does not deny that there is at least one if not more embodiments completely well within the skill of the art; thus, there is no *prima facie* enablement failure, and Applicant's claims are consequently appropriately enabled as to positron lifetime calculations.

Applicant further notes that the examiner admitted (Office Action, page 5, lines 1-5) that the Applicant-cited article by C. Szeles et al., entitled POSITRON-ANNIHILATION SPECTROSCOPY, describes Doppler broadening and positron lifetime calculation. Such admission acknowledges that these techniques were indeed known in the art, and since techniques are the same as algorithms in patent law (see *State Street Bank, supra*, and Merriam-Webster, *inter alia*), these algorithms are consequently also admittedly enabled.

Relatedly, 3-D imaging algorithms are known and understood in the art. Indeed, Applicant specifically referenced the 3-D "techniques" used in "positron emission tomography (PET)" as being "readily adapted for use with the present invention (Applicant's Application Specification, Publication No. US 2003/0043951 A1, page 8, paragraph 0060, lines 10-13). Such a "technique" is an "algorithm" per *State Street Bank*, and Merriam-Webster, *inter alia*, and, as with the positron lifetime algorithm (as well as the Doppler broadening, above, and the selective activation, below), the examiner has not presented evidence nor scientific reasoning to suggest that such a description and reference is non-enabling. The rejection therefore fails.

Next, as to the selective activation algorithm, this is described in detail in the present application specification. See e.g., page 6, paragraph 0047 of the publication, no. US 2003/0043951 A1; where the first step is to determine whether the specimen "to be analyzed includes one or more isotopes or 'positron emitters' that are capable of photon activation." Then, data as from a table such as Tables I and/or II of the present application (also on page 6 of the publication) can be consulted to determine what energy level to be used to produce the particular positrons, gamma rays and/or photons. The apparatus of the present invention can then be instructed to bombard the specimen using photons of the desired energy level. There is no evidence nor scientific reasoning given nor plausible to suggest that this description is non-enabling. The rejection thus fails.

Additionally, it should be noted that although the examiner objects here also to the "black box" character of the selective activation algorithm (Office Action, page 4, line 16-21), the "internals," thereof are indeed fully-well described in this case, the state of the art, or both; see the immediate above discussion. Moreover, any "black box" nature of the selective activation algorithm is, as was true for the data processing system above, is of exactly the character of the "black box" upheld as enabled in the *In re Hayes Microcomputer Products* case described above, where again the court upheld the sufficiency of the specification where it was "sufficient for a skilled artisan to understand the subject matter of the claimed invention."

The question is whether the specification provides sufficient information for the skilled artisan to practice at least one representative embodiment or set of embodiments, with appropriate

guidance from the art for any further details. The question is not whether Applicant has provided any further proof or evidence over and above what is in the specification as-filed. The question is also not whether Applicant has stated anything in an uncorroborated fashion. The issue is rather whether the specification speaks for itself. And, if the examiner fails to provide evidence or scientific reasoning that the specification does not speak for itself, then the examiner has failed to carry his burden. The presumption of an enabling disclosure survives and the rejection fails.

Thus, by relying upon the understandings of those skilled in the art, as well as providing full disclosures and further references to even more detailed disclosures on these subjects, Applicant's specification is sufficiently well-enabled on Doppler broadening, positron lifetime, selective activation and 3D imaging algorithms for claims 20-24 incorporating such subject matter. Hence, contrary to the allegation on page 3 of the Office Action, lines 16-21, the skilled artisan is, has been and/or was made sufficiently-well aware of what these algorithms are, and how and in what manner these should or could be selected and/or modified, as necessary to achieve the desired results. The question is not whether there may need to be some experimentation for perfection of some embodiments, but rather whether such experimentation would be "undue." This question was not asked.

Therefore, the examiner's unsupported and incorrect allegations concerning the Doppler broadening, positron lifetime, 3-D imaging and selective activation enablement for claims 20-24, *inter alia*, is traversed and should be withdrawn.

Next, with regard to the Section 112 rejections of claims 24-26, the examiner takes issue with the claim language "activating a positron emitter," see the Office Action dated September 27, 2004, page 2, lines 10-11 and page 5 lines 6-21. The specific objection is that the examiner believes that one does not "activate a positron emitter," stating rather that it is a precursor that is activated. While the examiner's definition of "activate" also may be generally correct, Applicant has chosen to define the term "activate" as specifically set forth in the detailed description. Applicant's definition is consistent with (i.e., not repugnant to) the manner in which persons having ordinary skill in the art commonly refer to "activation" as the process of bombarding a stable atom with energy in order to create an unstable isotope or positron emitter that subsequently decays by emitting a positron. Indeed, the U.S. Patent Office has specifically

allowed this type of description in several U.S. patents. Note, Applicant's claim language does not require the pre-existence of an unstable isotope or positron emitter prior to bombardment, rather only the use of photons in order to "activate" an operation or reaction which results in the positron emission. The claims, thus contrary to the examiner's allegations, do not necessarily "impl[y]" the creation of "another positron emitter ... from an already existing positron emitter before positrons are produced." (Office Action, page 5, lines 14-15.) Applicant is not claiming to have enabled anything which is physically impossible, however, if it is physically possible, then it is within the scope of the claims subject only to the understanding and ability of the skilled artisan in making or using the invention. Therefore, Applicant's use of the term "positron emitter" and reference to "activation" of a positron emitter satisfies the requirements of Section 112.

Moreover, Applicant notes that the terms "activate" and "activation" are defined by the McGraw-Hill Dictionary of Scientific and Technical Terms, Fifth Edition, as follows:

> "activate . . . [nucleo] To induce radioactivity through bombardment by neutrons or by other types of radiation."
>
> "activation ... [nucleo] The process of inducing radioactivity by bombardment with neutrons or with other types of radiation."

The use of the terms "activate" or "activation" in conjunction with the term "positron emitter" refers to the inducement of radioactivity by bombardment with neutrons or other types of radiation. The use of the term "activation" in this way is not contrary (i.e., not repugnant) to its normal meaning in this field. The positron emitter is the radioactive element. Thus, a "positron emitter" is formed or "activated" by bombardment with neutrons or other types of radiation.

The pending application describes the process in exactly this way. For example, paragraph [0044] states: "A list of positron emitters, the threshold gamma ray energies required to **form or 'activate'** the positron emitters, as well as their half-lives are presented herein as Tables I and II." (emphasis added). The written description therefore defines the term "activate" as synonymous with the term "form." Applicant's selected definition of "activate" is consistent with the ordinary meaning of that term as understood by those having ordinary skill in the art.

Applicant notes also that several patents of record describe positron emitters as unstable

isotopes that can be "activated." For example, U.S. Patent No. 4,980,901 to Miller states:

> "The photons are produced from the nitrogen atoms in the object 18 as a result of the activation of the nuclei of the nitrogen atoms by x-rays from the source 12. The **activated nuclei of the nitrogen atoms then decay** with a half life of approximately ten (10) minutes by isotropically emitting positrons." Col. 3, lines 47-52 (emphasis added).

The "activated nuclei" that decay are ^{13}N, which are positron emitters. Therefore, Miller is effectively referring to "activated positron emitters."

U.S. Patent No. 5,175,756 to Pongratz uses nearly identical language:

> "The half-life of **activated nitrogen atoms (^{13}N)** is approximately 10 minutes, which is sufficiently long to permit X-ray examination of the luggage. . ." Col. 3, lines 38-40. (emphasis added).

Again, because ^{13}N is a positron emitter, the cited language of Pongratz also effectively refers to "activated positron emitters."

In addition, Applicant himself has used the same language in an issued U.S. patent. Specifically, U.S. Patent No. 6,178,218 to Akers states as follows:

> "Another neutron **activated positron source** formed within a metal test specimen is ^{58}Co, which is formed by in situ neutron capture from ^{59}Co within the metal." (emphasis added).

Akers directly refers to an "activated" positron source (i.e., positron emitter). Even more significantly, the claim language of Akers uses the term "positron emitter" in nearly the same manner as the pending claims. More specifically, claims 1 and 10 of Akers both state:

> "(a) providing a metal specimen having **a positron emitter source therein**;
>
> (b) **activating the positron emitter source** by neutron activation. . ." (emphasis added).

Clearly then, persons having ordinary skill in the art regard "positron emitters" as being "activated" or capable of being "activated." Stated another way, persons having ordinary skill in the art would readily understand the meaning of the term "activating a positron emitter" as it is

used in the present application as well the reference to a "positron emitter" as something that can be "activated" (i.e., formed) as the result of bombardment. Any doubt as to the meaning of "activated" in the context of the present application is erased by reference to the specification which defines "activated" as "formed." Because persons having ordinary skill in the art use the terms in these ways, the claim terms at issue are sufficiently enabling and definite under Section 112 as a matter of law.

In addition, the U.S. Patent and Trademark Office has specifically allowed the use of these terms in these ways. The patents to Miller and Pongratz refer to "activated" ^{13}N. Because ^{13}N is a positron emitter, Miller and Pongratz effectively refer to an "activated positron emitter." The patent to Akers utilizes the term "activated positron source." The claims of the Akers patent also refer to a specimen having "a positron emitter source therein" and also specifically refer to "activating the positron emitter source." Accordingly, because the Patent Office has previously allowed the use of these terms in this way, Applicant's use of these terms in this way is sufficiently enabling and definite under Section 112.

Applicant further notes that MPEP 2173.02 "Clarity and Precision" specifically states as follows:

> "The examiner's focus during examination of claims for compliance with the requirement for definiteness of 35 U.S.C. 112, second paragraph is whether the claim meets the threshold requirements of clarity and precision, **not whether more suitable language or modes of expression are available**." (emphasis added).

In addition, Section 2173.02 goes on to state that examiners:". . .**should not reject claims or insist on their own preferences** if other modes of expression selected by applicants satisfy the statutory requirement." (emphasis added).

Accordingly, the fact that there may be other language or modes of expression available cannot be used to support a rejection under Section 112 so long as the language used meets the threshold requirements of clarity and precision. Moreover, the examiner should not have insisted on his own preferences, again so long as the requirements of Section 112 are met, which they are here. Because persons having ordinary skill in the art describe a "positron emitter" as something

that can be "activated," Applicant's use of these terms in the same way in the pending application *prima facie* meets the requirements of clarity and precision required by Section 112.

Note, repugnant means "offensive and completely unacceptable," "characterized by opposition and especially contradictory opposition." *Webster's Third New International Dictionary, Unabridged.* Merriam-Webster, 2002; http://unabridged.merriam-webster.com (retrieved 12 Nov. 2004). The use of any form of "activate" is not contradictory to the examiner's contended definition. Both definitions embrace the concept that a specimen is bombarded with photons and an overall operation is thereby "activated" to produce the emission of positrons from a positron emitter. In both cases photon bombardment results in positron emission, and this process or reaction is "activated" in either case. Whether a stable precursor is involved or not does not change either definition of "activate" as in "activation" of an operation involving a positron emitter to emit positrons.

Note further that this issue, like all other enablement issues, is to be viewed by the skilled artisan; i.e., what would the skilled artisan be enabled to do upon reading the present specification? Clearly, the skilled artisan would be enabled to bombard with photons a specimen having a capacity to have positron emitters form positrons in response to the photon bombardment. The skilled artisan will not be so confused as to be unable to complete those steps to recreate the invention, regardless the possible intermediate necessity of the actual actuation of a stable isotope to convert to an unstable isotope (e.g., a positron emitter). The skilled artisan is thus enabled, consequently meaning that the specification is sufficiently enabling under section 112.

In summation, then, Applicant's use of the term "positron emitter" as something that can be "activated" is sufficiently enabling and definite as a matter of law. Applicant's use of these terms as defined in the specification is consistent with the normal meanings of these terms. Indeed, these terms are used in the exact same way by persons having ordinary skill in the art. The U.S. Patent and Trademark Office has already found such language and usage to be sufficiently definite under Section 112, as it appears repeatedly in issued patents. Accordingly, Applicant requests withdrawal of the rejections of claims 26-28.

Re: Rejection of claims 7, 20-24 and 26-28 under 35 U.S.C. §112, second paragraph.

Legal Standard For Rejecting Claims
Under 35 U.S.C. §112, second paragraph

The test for definiteness of claim language is whether a person having ordinary skill in the art would understand the bounds of the claim when read in light of the specification, and the degree of precision necessary for adequate claims depends on the nature of the subject matter. *Miles Laboratories, Inc., v. Shandon, Inc.*, 27 USPQ2d 1123 (Fed. Cir. 1993).

The Examiner's Rejections:

The examiner rejected claims 7, 20-24 and 26-28 under 35 U.S.C. §112, second paragraph, as indefinite for the reasons given for his Section 112, first paragraph, rejections.

In responding to this rejection, applicant hereby repeats the arguments set forth above in response to the Section 112, first paragraph, rejections. That is, the data processing system operation of the photon source of claim 7 is not only enabled, it is also not vague nor indefinite for the same reason, i.e., the person having ordinary skill in the art would understand it. Similarly, the challenged algorithms of claims 20-24 are enabled and not vague nor indefinite because the skilled artisan would understand them. Moreover, not only are the terms "positron emitter," "activating" and "activation" of claims 26-28 described in the specification, they are used in the same manner as in the pending claims, i.e., as in a process that can be "activated" as in being part of an operation which is "activated" generally such that the positron emitter ultimately emits a positron. In view of these factors, it cannot be said that the terms "positron emitter," "activating" and/or "activation" are not sufficiently definite.

Note further on the positron emitter in specific response to the examiner's further contentions on pages 6 and 7 of the Office Action: Applicant's use of "activation" of a "positron emitter" is not repugnant to the examiner's definition or the uses of positron emitters in the cited art. Again, the "activation" in all cases is ultimately of an overall operation or reaction in which a positron emitter is ultimately caused to emit a positron. This is true whether it involves the

"formation" of a positron emitter or otherwise, and is thus consistent in Applicant's claims as well as in the examiner's argued interpretation and in the specific references.

Note further that the examiner's allegation of any distinction between the present and past tense uses of the verb "activate" relative to the Miller, Pongratz and Akers references sheds no light. Indeed, the examiner's own discussion hereof recognizes and supports the Applicant's position. As the examiner notes in his example (Office Action, page 6, line 17 through page 7, line 4), it is the positron emitter (there, the unstable nitrogen-13) with which the verb "activate" is used, present or past tense. Regardless whether the positron emitter must be produced by a "photonuclear reaction" of the stable precursor (there, nitrogen-14), the verb "activate" is still used in reference to the positron emitter, whether in "activating" or to have been "activated."

The further discussions of the Akers "positron emitter source" or of the Munro III reference do not change the situation. The issue is whether a person having ordinary skill in the art would be sufficiently well-apprised of the invention as defined in these claims when read in light of the specification. As was true with the enablement discussion, the skilled artisan is not going to be so confused by any of the present wording so as not to understand the invention.

To sum-up, because the terms "positron emitter," "activating" and "activation" are discussed throughout the specification and used in the same manner as the pending claims, a person having ordinary skill in the art would readily understand the meaning of these terms in the context of the present application.

Therefore, applicant respectfully requests withdrawal of the rejections of claims 7, 20-24 and 26-28 under Section 112, second paragraph.

Re: Rejections under 35 U.S.C. §103(a).

Claims 1, 5 and 8 stand rejected under 35 U.S.C. §103(a) as allegedly obvious over Akers, et al., U.S. Patent No. 6,178,218 (hereafter, "Akers") in view of the Firestone webpage entitled "The Berkeley Laboratory Isotopes Project, Exploring the Table of Isotopes" (hereafter, "Firestone") alone, or in view of Firestone and Obermayer, US Patent No.

3,662,882 (hereafter, "Obermayer").

Claims 2 and 3 stand rejected under 35 U.S.C. §103(a) as allegedly obvious over either of the combinations of Akers with Firestone or Akers with Firestone and Obermayer; both further in view of Miller, US Patent No. 4,980,901 (hereafter, "Miller").

Claims 20-24 and 31 stand rejected under 35 U.S.C. §103(a) as allegedly obvious over either of the combinations of Akers with Firestone or Akers with Firestone and Obermayer; both further in view of either one of the webpages of Gedcke (ORTEC AN 59, "How Counting Statistics Controls Detection Limits and Peak Precision") (hereafter, "Gedcke"), or Simon Fraser University, Radiation Safety Office (Radiation Counting Statistics) (hereafter, "Simon Fraser University"), and/or as a matter of optimization.

Claims 26, 27, 28 and 30-36 stand rejected under 35 U.S.C. §103(a) as allegedly obvious over either of the combinations of Akers with Firestone or Akers with Firestone and Obermayer; both further in view of the Szeles et al. paper entitled, "Positron-Annihilation Spectroscopy" (hereafter, "Szeles").

Legal Standard For Rejecting Claims
Under 35 U.S.C. §103

The test for obviousness under 35 U.S.C. §103 is whether the claimed invention would have been obvious to those skilled in the art in light of the knowledge made available by the reference or references. *In re Donovan*, 184 USPQ 414, 420, n. 3 (CCPA 1975). It requires consideration of the entirety of the disclosures of the references. *In re Rinehart*, 189 USPQ 143, 146 (CCPA 1976). All limitations of the claims must be considered. *In re Boe*, 184 USPQ 38, 40 (CCPA 1974). In making a determination as to obviousness, the references must be read without benefit of applicant's teachings. *In re Meng*, 181 USPQ 94, 97 (CCPA 1974). In addition, the propriety of a Section 103 rejection is to be determined by whether the reference teachings appear to be sufficient for one of ordinary skill in the relevant art having the references before him to make the proposed substitution, combination, or other modifications. *In re Lintner*, 173 USPQ 560, 562 (CCPA 1972).

A basic mandate inherent in Section 103 is that a piecemeal reconstruction of prior art patents shall not be the basis for a holding of obviousness. It is impermissible within the framework of Section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. *In re Kamm*, 172 USPQ 298, 301-302 (CCPA 1972). Put somewhat differently, the fact that the inventions of the references and of the applicant may be directed to concepts for solving the same problem does not serve as a basis for arbitrarily choosing elements from references to attempt to fashion applicant's claimed invention. *In re Donovan, supra*, at 420.

In the case of *In re Wright*, 6 USPQ2d 1959 (Fed. Cir. 1988) (restricted on other grounds by *In re Dillon*, 16 USPQ2d 1897 (Fed. Cir. 1990), the Court of Appeals for the Federal Circuit decided that the Patent Office had improperly combined references which did not suggest the properties and results of the applicants' invention nor suggest the claimed combination as a solution to the problem which applicants' invention solved. The CAFC reached this conclusion after an analysis of the prior case law, at p. 1961:

> "We repeat the mandate of 35 U.S.C.§ 103: it is the invention as a whole that must be considered in obviousness determinations. The invention as a whole embraces the structure, its properties, and the problem it solves. See, e.g., *Cable Electric Products, Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1025, 226 USPQ 881, 886 (Fed. Cir. 1985) ("In evaluating obviousness, the hypothetical person of ordinary skill in the pertinent art is presumed to have the 'ability to select and utilize knowledge from other arts reasonably pertinent to [the] particular problem' to which the invention is directed"), quoting *In re Angle*, 444 F.2d 1168, 1171-72, 170 USPQ 285, 287-88 (CCPA 1971); *In re Antonie*, 559 F.2d 618, 619, 195 USPQ 6, 8 (CCPA 1977) ("In delineating the invention as a whole, we look not only at the claim in question... but also to those properties of the subject matter which are inherent in the subject matter **and** are disclosed in the Specification") (emphasis in original).
>
> The determination of whether a novel structure is or is not "obvious" requires cognizance of the properties of that structure and the problem which it solves, viewed in light of the teachings of the prior art. See, e.g., *In re Rinehart*, 531 F.2d 1048, 1054, 189 USPQ 143, 149 (CCPA 1976) (the particular problem facing the inventor must be considered in determining obviousness); see also *Lindemann Maschinenfabrik GmbH v. American Hoist and Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984) (it is error to focus "solely on the product created, rather than on the obviousness or notoriousness of its

creation") (quoting *General Motors Corp. v. U.S. Int'l Trade Comm'n*, 687 F.2d 476, 483, 215 USPQ 484, 489 (CCPA 1982), cert. denied, 459 U.S. 1105 (1983).

> Thus the question is whether what the inventor did would have been obvious to one of ordinary skill in the art attempting to solve the problem upon which the inventor was working. *Rinehart*, 531 F.2d at 1054, 189 USPQ at 149; see also *In re Benno*, 768 F.2d 1340, 1345, 226 USPQ 683, 687 (Fed. Cir. 1985) ("applicant's problem" and the prior art present different problems requiring different solutions")."

More recently, the CAFC has reiterated the necessity that motivation be identified in choosing to combine prior art references for an obviousness type rejection. As stated by the Court of Appeals for the Federal Circuit in *In re Rouffet*, 47 USPQ2d 1453 (Fed. Cir. 1998) at 1457:

> "[V]irtually all [inventions] are combinations of old elements." *Environmental Designs, Ltd. V. Union Oil Co.*, 713 F.2d 693, 698, 218 USPQ 865, 870 (Fed.Cir. 1983)("Most, if not all, inventions are combinations and mostly of old elements."). Therefore an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be "an illogical and inappropriate process by which to determine patentability." *Sensonics, Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570, 38 USPQ2d 1551, 1554 (Fed.Cir. 1996).
>
> To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed."

A reference which teaches away from the applicant's invention may not properly be used in framing a 35 U.S.C. §103 rejection of applicant's claims. See *United States v. Adams*, 148 USPQ 429 (1966).

The Examiner's Rejections

The examiner rejected claims 1, 5 and 8 under 35 U.S.C. §103(a) as being unpatentable over Akers in view of Firestone alone or in view of Firestone and Obermayer. These rejections fail because the examiner has failed to establish the required *prima-facie* case of obviousness. In addition, none of these references contain the suggestion or incentive required to combine the references in the manner urged by the examiner.

The Firestone reference merely indicates that ^{62}Cu may be produced by a charged particle reaction, a photon reaction, or by fast neutron activation. However, the Firestone reference does not teach or suggest how ^{62}Cu may be used for *any* purpose, much less how ^{62}Cu may be used in non-destructive testing apparatus in the manner defined by the pending claims. Instead, the examiner's rejections are based on the mere conclusion that because Firestone discloses that ^{62}Cu may be formed or produced by a photon reaction, that it would be obvious to "modify the apparatus, as disclosed by Akers et al., by the teaching of Firestone," thereby finding an element in Firestone not described in Akers. This is not the test for obviousness under Section 103.

The test for obviousness is not whether the various elements of the claim can be found in the prior art, but whether the prior art provides some suggestion, incentive, or motivation to a person having ordinary skill in the art to combine those elements to make the claimed combination. *In re Rouffet, supra.* The examiner can satisfy the burden of showing obviousness "only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references." *In re Lee*, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002). This the examiner has not done. He has not pointed to any objective teachings in either Akers or Firestone (or Obermayer, see below) that would lead an individual to combine the relevant teachings in the manner required by the rejected claims. Indeed, it is impossible to do so because Firestone is completely silent as to any possible uses of ^{62}Cu. While the Akers reference does disclose the use of ^{62}Cu, Akers forms the ^{62}Cu by neutron activation. Therefore, there is no need in Akers, i.e., no motivation in pursuit of the purposes of Akers, thus no suggestion or incentive, to substitute neutron activation for photon activation. While the present invention does suggest the use of photon activation to form ^{62}Cu, it is well-established law that the teachings of an invention cannot be used a blueprint or guide to pick and choose from among the prior art only those aspects contained in the invention without regard to what each reference fairly teaches to persons having ordinary skill in the art.

This is what the examiner has done. That is, armed with the teachings of the present invention, the examiner has searched the prior art for the various elements and limitations recited in the pending claims in a misplaced attempt to establish the obviousness of the pending claims. However, what counts is the objective teachings of the prior art. Here, there are no objective teachings in the prior art that would lead a person having ordinary skill in the art to combine the teachings of the references.

Because the examiner has failed to identify any objective teaching in any of Akers or Firestone (or Obermayer, see below) that would lead a person having ordinary skill in the art to combine the relevant teachings of the references, the examiner failed to establish the required *prima-facie* case of obviousness of claim 1. Therefore, claim 1, and the claims depending therefrom, i.e., claims 2, 3, and 5, are allowable.

Independent claim 8 is allowable for the same reasons expressed above for claim 1. That is, the examiner has failed to establish the required prima-facie case of obviousness of claim 8 by failing to identify any objective teaching in either Firestone or Akers that would lead a person having ordinary skill in the art to combine the references in the manner required by claim 8. The mere conclusory statements offered by the examiner are not enough.

Lastly, the Firestone reference is not appropriate as a reference in this case because the date of publication has not been appropriately established as being *prior* to the filing of the Applicant's present application. Note, the date of publication of a reference must be demonstrated, or the reference may not be used to reject the claims. MPEP 2128; and see *In re Wyer*, 655 F.2d 221, 227, 210 USPQ 790, 795 (CCPA 1981) ("[a]ccordingly, whether information is printed, handwritten, or on microfilm or a magnetic disc or tape, etc., the one who wishes to characterize the information, in whatever form it may be, as a 'printed publication' ... should produce sufficient proof of its dissemination or that it has otherwise been available and accessible to persons concerned with the art to which the document relates and thus most likely to avail themselves of its contents.'" (citations omitted). See also *Amazon.com v. Barnesandnoble.com*, 73 F. Supp. 2d 1228, 53 USPQ2d 1115 (W.D. Wash. 1999). Primarily, the point of this issue is establishing when the reference became available as a reference. MPEP 2128.02. Even though it may be that no date is printed on the reference itself, evidence of some kind must be presented to

establish the date on which a publication became accessible to the public. *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 7 USPQ2d 1057 (Fed. Cir.), *cert. denied,* 988 U.S. 892 (1988); *In re Hall,* 781 F.2d 897, 228 USPQ 453 (Fed. Cir. 1986).

Indeed, and as the examiner has noted, there is a date of "last update" listed on the Firestone webpage for the Isotope Periodic Table (see notation at the bottom of the page: "Last Updated May 22, 2000"). However, this covering webpage is not the ultimate location of the information cited by the examiner. Rather, the examiner pointed as an example in the Office Action (page 9, lines 5-10; "click on Cu"), to the copper, Cu, portion of the Periodic Table of Isotopes, a portion which provides for connecting to a second webpage which lists copper isotopes that each then provide for connection to still further discrete webpages. This second webpage with the list of isotopes does not have a publication date (last update or otherwise), nor do many, if any, of the further discrete webpages accessible therefrom. Even so, following the examiner's example still further (as the information he cites is also not located on this second webpage), pointing to and "clicking on" ^{62}Cu yields a still further discrete webpage on which the examiner found the notations regarding the creation of ^{62}Cu by neutron activation or photon reaction. Nevertheless, there are several dates displayed on this last page, the most recent of which being in 2002 (namely, "12/2002" as taken from the sub-heading: "Most Recent ENSDF Data (12/2002)"). Thus, this last webpage, the page with the data relied-upon by the examiner in his rejection, must have been published on or after this latest occurring date in 2002, long after Applicant's filing date of August 17, 2001.

Therefore, the publication date for the Firestone information cited by the examiner is not established, nor can it be, as having been published prior to the Applicant's present application. As a result, reliance upon the Firestone reference is not proper and all rejections based thereupon must be withdrawn; i.e., the rejections of claims 1-3, 5, 8, 20-24, 26-28 and 30-36, all the claims rejected as obvious herein, must be withdrawn. Action to this end is respectfully requested.

Note further that Obermayer does not cure the deficits of Firestone and/or Akers. Indeed, as the examiner claims, Obermayer teaches a problem with neutron activation in that the material or the container thereof may remain radioactive for an undesirable period of time. However, that problem has not been established as having any bearing on the present case. More specifically,

even though Obermayer may teach such a problem and a plausible solution therefore, he does so in his context which is not necessarily relevant to Applicant's present invention. Indeed, Obermayer does not teach that photon radiation is more advantageous than neutron activation *except* in his case of reducing radioactivity times in his field of composition and/or weight determinations. There is thus no suggestion in or from Obermayer that the problem of long radioactive times, particularly in his area of composition and weight determination, is also a problem for lattice defect detection, i.e., Applicant's current endeavor. Thus, the Obermayer solution to his problem is not suggestive or motivating toward Applicant's conclusion. Note, Applicant has noted his problem with neutron activation as being limitative because of the very few elements which produce positrons in response to neutron bombardment (e.g., copper, cobalt and zinc, see paragraph 0009 of Applicant's specification). Thus Obermayer does not suggest or motivate toward any combination with Akers or Firestone for reaching Applicant's claimed invention. Lacking appropriate motivation for the combination, Obermayer is therefore not a proper reference for a section 103 rejection. *Rouffet* and *Sensonics, supra.* This rejection is thus in error and must be withdrawn.

Moreover, the examiner's citation to *In re McLaughlin* is inapposite and not supported by the record. There is no showing that the substitution of a photon source for a neutron source is a substitution of a "well-known technique" or based on a "fundamental nuclear engineering principle" (Office Action, page 10, lines 7 and 13). Akers, Firestone and Obermayer do not demonstrate such a conclusion. And, there is no affidavit of the examiner filling this void either as there must be per 37 CFR 1.104(d)(2).

Next, Claims 2 and 3 stand rejected under 35 U.S.C. §103(a) as allegedly obvious over either of the combinations of Akers with Firestone or Akers with Firestone and Obermayer; both further in view of Miller, US Patent No. 4,980,901 (hereafter, "Miller").

As a first point, Applicant wishes to re-note that there is no evidence that the Firestone information cited by the examiner was published prior to the Applicant's present application. As a result, reliance upon the Firestone reference is not proper and the rejections of claims 2 and 3 based thereupon must be withdrawn. *In re Wyer, supra* and MPEP 2128.

Moreover, there is no suggestion for any of these modifications. As set forth in detail above (which discussion is incorporated herein in its entirety as if fully set forth here), there is no suggestion or motivation in or from any of Akers, Firestone or Obermayer to combine or extend the relative teachings thereof toward any of the other references. Therefore, there is not an appropriate basis for combination of Akers with either or both of Firestone or Obermayer, and any rejection based thereon fails. Additionally, even if *arguendo*, Miller teaches the electron accelerator and bremsstrahlung x-rays urged by the examiner, this is likewise not a teaching sufficient for suggesting or motivating a combination of reference teachings to arrive at Applicant's unobvious results.

Indeed, Applicant is not hereby claiming to have invented bremsstrahlung photons, nor either the unique means for formation thereof. Rather, Applicant even noted in his specification (paragraph 0036) that electron accelerators were known in the art (an example given was the model 6000 linear accelerator available from Varian Corp. of Palo Alto, California). Thus, the teachings of Miller are cumulative to Applicant's description of what is known in the art, and are not further relevant here.

What Applicant is claiming in these claims 2 and 3, on the other hand, are combinations of elements in non-destructive testing apparatuses which include, *inter alia*, particular photon sources capable of producing bremsstrahlung photons used in combination with the other elements of the non-destructive testing apparatuses of claim 1. The entireties of claims 1, 2 and 3 are at issue, not the particular electron accelerator/photon source. Thus, these rejections of claims 2 and 3 are also in error and must be withdrawn.

Claims 20-24 and 31 stand rejected under 35 U.S.C. §103(a) as allegedly obvious over either of the combinations of Akers with Firestone or Akers with Firestone and Obermayer; both further in view of either one of the webpages of Gedcke (ORTEC AN 59, "How Counting Statistics Controls Detection Limits and Peak Precision") (hereafter, "Gedcke"), or Simon Fraser University, Radiation Safety Office (Radiation Counting Statistics) (hereafter, "Simon Fraser University"), and/or as a matter of optimization.

Additionally, claims 26, 27, 28 and 30-36 stand rejected under 35 U.S.C. §103(a) as

allegedly obvious over either of the combinations of Akers with Firestone or Akers with Firestone and Obermayer; both further in view of the Szeles et al. paper entitled, "Positron-Annihilation Spectroscopy" (hereafter, "Szeles").

Starting here also, Applicant re-notes that there is no evidence that the Firestone information cited by the examiner was published prior to the Applicant's present application. As a result, reliance upon the Firestone reference is not proper and the rejections of claims 20-24, 26-28 and 30-36 based thereupon must be withdrawn. *In re Wyer, supra* and MPEP 2128.

Similarly, there is also no evidence of record that either of the Gedcke or Simon Fraser University references were published prior to the filing of Applicant's present application. Indeed, in an even more manifestly non-establishment, there are no dates affixed to the Gedcke or Simon Fraser University reference webpages; thus there is no way to determine when these may have been published, and worse no means for challenge by the Applicant. Therefore, reliance is inappropriate; *In re Wyer, supra* and MPEP 2128 and the rejections hereon, i.e., the rejections of claims 20-24, must be withdrawn.

Nevertheless, Applicant also traverses the examiner's specific assertions that the prior art sufficiently teaches the processes/algorithms (i.e., the Doppler broadening algorithm, normal vs. rapid activation/analysis, positron lifetime algorithm, and the three-dimensional imaging algorithm) to support any of the asserted obviousness rejections. In responding to this point, Applicant notes that while these algorithms/processes may generally indeed be known in the art, it is not known to apply these processes/algorithms in combination with the other elements of the pending claims. That knowledge stems from the present application which, of course, is not prior art. In other words, in making this statement, the examiner is improperly using the Applicant's own teachings as a blueprint to piece together prior art elements in the manner required by the pending claims. This use is improper and cannot be used to sustain an obviousness rejection under Section 103. As the Court of Appeals for the Federal Circuit stated in *In re Rouffet, supra*:

> ". . .rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be "an illogical and inappropriate process by which to determine patentability." [citations omitted].

More specifically as to the Doppler broadening of present claims 20 and 31; the mere fact that Akers teaches a Doppler broadening technique/algorithm, which Applicant indeed suggests can be used within the apparatus of the present invention, is by itself no suggestion or motivation for making the combination modifications resulting in the entirety of either of the claimed apparatuses. As set forth in detail above (which discussion is incorporated herein in its entirety as if fully set forth here), there is no suggestion or motivation in or from any of Akers, Firestone or Obermayer to combine or extend the relative teachings thereof toward any of the other references. Therefore, there is not an appropriate basis for a combination of Akers with either or both of Firestone or Obermayer, whether including the Akers Doppler broadening algorithm or otherwise; and any rejection based thereon fails.

What Applicant is claiming in these claims 20 and 31, on the other hand, are combinations of elements in non-destructive testing apparatuses which include, *inter alia*, particular algorithms capable of Doppler broadening used in combination with the other elements of the non-destructive testing apparatuses of claims 20-24. The entireties of claims 20 and 31 are at issue, not the particular algorithm. Thus, these rejections of claims 20 and 31 are also in error and must be withdrawn.

Next, as to the normal vs. rapid activation/analysis processes of claims 20-24, even if, *arguendo*, appropriately available prior art (Gedcke, Simon Fraser University or otherwise), teaches such techniques/algorithms, is nevertheless by itself no suggestion or motivation for making the combination modifications resulting in the entirety of any of the claimed apparatuses of claims 20-24. As set forth in detail above (which discussion is incorporated herein in its entirety as if fully set forth here), there is no suggestion or motivation in or from any of Akers, Firestone or Obermayer to combine or extend the relative teachings thereof toward any of the other references. Therefore, there is not an appropriate basis for a combination of Akers with either or both of Firestone or Obermayer, whether including both a normal and a rapid activation/analysis algorithm or otherwise; and any rejection based thereon fails.

What Applicant is claiming in these claims 20-24, on the other hand, are combinations of elements in non-destructive testing apparatuses which include, *inter alia*, particular algorithms

capable of normal and rapid activation/analysis used in combination with the other elements of the non-destructive testing apparatuses of claims 20-24. The entireties of claims 20-24 are at issue, not the particular algorithm. Thus, these rejections of claims 20-24 are also in error and must be withdrawn.

Applicant further notes that these rejections remain in error regardless the alleged "notorious scientific principle" about accuracy and precision (Office Action, page 12, lines 10-12, 16-17, and page 13, lines 5-6 ("because such modification is no more than the use of notorious scientific principles in the optimization of the process"). Rather, Applicant points to MPEP 2144.02 and 2144.03 where the appropriate process for dealing with so-called "notorious scientific principles" is set forth. Most specifically, Applicant notes that the Administrative Procedures Act as described in MPEP 2144.03 does not allow reliance hereon without evidentiary support. To wit, "[i]t is never appropriate to rely solely on common knowledge in the art without evidentiary support in the record as the principal evidence upon which a rejection was based. *See In re Zurko*, 258 F.3d 1379, 59 USPQ2d 1693 (Fed. Cir. 2001); and, *In re Ahlert*, 424 F.2d 1088, 165 USPQ 418 (CCPA 1970). MPEP 2144.02 also requires evidentiary support. The examiner must therefore produce evidence of the principle even if it is but an affidavit of personal knowledge under 37 CFR 1.104(d)(2). Thus, even if true, the examiner's unsupported reliance upon such a principle without evidentiary support is improper (note, the statistical counting of Gedcke and Simon Fraser University nevertheless do not ultimately actually teach the Applicant's processes). Rejections based hereon are thus in error and must be withdrawn.

In addition, Applicant incorporates herein the arguments set forth above with respect to the allowability of claims 1-3, 5 and 8. That is, neither Akers nor Firestone nor Obermayer contain any objective teachings that would lead a person having ordinary skill in the art to combine them in the manner required by claim 20, nor has the examiner identified any such objective teachings. The examiner's conclusory statements are not a sufficient basis for sustaining an obviousness rejection of claim 20. That is, nothing in the prior art discloses or suggests a non-destructive testing apparatus having a data processing system that operates in accordance with a "normal activation/analysis process when a half-life of a selected positron emitter within the specimen being tested is greater than a predetermined half-life." as specifically required by claim 20. In addition, claim 20 requires that the data processing system operate in

accordance with a "rapid activation/analysis process when a half-life of the selected positron emitter within the specimen being tested is less than the predetermined half-life, said data processing system, when operated in accordance with the rapid activation/analysis process, alternatively activating said photon source and detecting raw data indicative of a positron annihilation event." Because the prior art fails to disclose or suggest at least these limitations of claim 20, claim 20 is allowable.

Claim 21 is independently allowable in that the examiner failed to identify any objective teachings in any of the references that disclose or suggest the additional limitations of claim 21 "wherein said data processing system includes a positron lifetime algorithm, said positron lifetime algorithm processing raw data indicative of a positron formation event to produce output data indicative of a changing presence or absence of a lattice defect."

Claim 22 is independently allowable in that there has not been identified any objective teachings in any of the references that suggest the additional limitations hereof further including "a second detector" and "wherein said data processing system includes a positron lifetime algorithm, said positron lifetime algorithm processing data indicative of a positron formation event to produce output data indicative of a changing presence or absence of a lattice defect."

Claim 23 is independently allowable in that the examiner failed to identify any objective teachings in any of the references that suggest the additional limitations of claim 23 "wherein said data processing system includes a selective activation algorithm, said selective activation algorithm responsive to a user input, said selective activation algorithm operating said photon source to produce photons having the predetermined energies in response to the user input."

Claim 24 is independently allowable in that the examiner failed to identify any objective teachings in any of the references that disclose or suggest the additional limitations of claim 24 "wherein said data processing system includes a three-dimensional imaging algorithm, said three-dimensional imaging algorithm processing raw data indicative of a positron annihilation event to produce output data indicative of a location of the presence or absence of a lattice defect."

Independent claim 26 is independently allowable in that the examiner failed to identify any

objective teachings in any of the references that disclose or suggest the additional limitations of claim 26 "means for alternately activating the positron emitter within the specimen being tested and detecting a positron annihilation event." Again, the prior art simply fails to disclose or even suggest such a means.

Note here also that the Szeles article has no further bearing on the allowability of claim 26 (or any other claim herein). Though indeed Szeles teaches algorithms (such as Doppler broadening, positron lifetime and 3D imaging) which can be used with apparatuses of the present invention, such a fact alone does not provide the suggestion or motivation necessary to make all of the modifications or combinations to reach the entirety of the apparatus of claim 26 (or any other claim herein). This rejection is thus in error and can thus be withdrawn.

Claim 27 is independently allowable in that the examiner failed to identify any objective teachings in any of the references that disclose or suggest the additional limitations of claim 27 "wherein said data processing means process raw data indicative of the positron formation event in accordance with a positron lifetime algorithm to produce output data indicative of a changing presence or absence of a lattice defect."

Claim 28 is independently allowable in that the examiner failed to identify any objective teachings in any of the references that disclose or suggest the additional limitations of claim 28 "further comprising second detector means" and "wherein said data processing means processes raw data indicative of the positron formation event in accordance with a positron lifetime algorithm to produce output data indicative of a changing presence or absence of a lattice defect."

Claim 30 is independently allowable in that the examiner failed to identify any objective teachings in any of the references that disclose or suggest the additional limitations of claim 30 "wherein said means for alternately activating. . .comprises means for moving the specimen being tested between an activation position and a detection position."

Independent claim 31 is allowable for the same reasons expressed above for claim 20. That is, the examiner has failed to establish the required prima-facie case of obviousness of claim 31 by failing to identify any objective teaching in either Firestone or Akers that would lead a

person having ordinary skill in the art to combine the references in the manner required by claim 31. The mere conclusory statements offered by the examiner are not enough. That is, the prior art fails to disclose or suggest the non-destructive testing apparatus of claim 31 comprising "a photon source for producing photons having a predetermined energy. . . the photons. . .resulting in the creation of positrons within the specimen. . ." as well as a "Doppler broadening processor" that produces "output data indicative of the presence or absence of a lattice defect in the specimen being tested." Again, merely picking and choosing from among the prior art certain of these elements amounts to nothing more than hindsight reconstruction and cannot form the basis for a valid obviousness rejection under Section 103.

Note here also that the Szeles article has no further bearing on the allowability of claim 31 (or any other claim herein). Though indeed Szeles teaches algorithms (such as Doppler broadening, positron lifetime and 3D imaging) which can be used with apparatuses of the present invention, such a fact alone does not provide the suggestion or motivation necessary to make all of the modifications or combinations to reach the entirety of the apparatus of claim 31 (or any other claim herein). This rejection is thus in error and can thus be withdrawn.

Claim 32 is independently allowable in that the examiner failed to identify any objective teachings in any of the references that suggest the additional limitations of claim 32 "further comprising three-dimensional imaging apparatus operatively associated with said detector and responsive to the raw data produced thereby, said three-dimensional imaging apparatus producing output data indicative of a location of the presence or absence of a lattice defect."

Claim 33 is independently allowable in that the examiner failed to identify any objective teachings in any of the references that disclose or suggest the additional limitations of claim 33 "further comprising a positron lifetime processor operatively associated with said detector and responsive to the raw data produced thereby, said positron lifetime processor producing output data. . .indicative of a changing presence or absence of a lattice defect."

Independent claim 34 is independently allowable in that the examiner failed to identify any objective teachings in any of the references that disclose or suggest the additional limitations of claim 34 "a positron lifetime processor operatively associated with said detector. . ., said positron

lifetime processor producing output data. . . indicative of a changing presence or absence of a lattice defect." Simply finding these elements, or corollaries for these elements, cannot form the basis for an obviousness rejection under *In re Rouffet, supra.*

Claim 35 is independently allowable in that the examiner failed to identify any objective teachings in any of the references that disclose or suggest the additional limitations of claim 35 "further comprising three-dimensional imaging apparatus operatively associated with said detector and responsive to the raw data produced thereby, said three-dimensional imaging apparatus producing output indicative of a location of the presence or absence of a lattice defect."

Independent claim 36 is allowable for the same reasons expressed above for claim 20. That is, the examiner has failed to establish the required prima-facie case of obviousness of claim 36 by failing to identify any objective teaching in either Firestone or Akers that would lead a person having ordinary skill in the art to combine the references in the manner required by claim 36. The mere conclusory statements offered by the examiner are not enough. That is, the prior art fails to disclose or suggest the non-destructive testing apparatus of claim 36 comprising "a photon source for producing photons having a predetermined energy. . . the photons. . .resulting in the creation of positrons within the specimen. . ." as well as a " data processing system" that includes a "Doppler broadening algorithm" that produces "output data indicative of the presence or absence of a lattice defect in the specimen being tested." Again, merely picking and choosing from among the prior art certain of these elements amounts to nothing more than hindsight reconstruction and cannot form the basis for a valid obviousness rejection under Section 103.

In addition, claim 36 is independently allowable in that the examiner failed to identify any objective teachings in any of the references that disclose or suggest the additional limitations of claim 36 wherein the data processing system includes "a positron lifetime algorithm. . .to produce output data indicative of a changing presence or absence of a lattice defect" and "a three-dimensional imaging algorithm. . .to produce output data indicative of a location of the presence or absence of a lattice defect."

Note still further here also that the Szeles article has no further bearing on the allowability of claim 31 (or any other claim herein). Though indeed Szeles teaches algorithms (such as

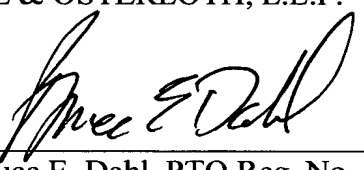
Doppler broadening, positron lifetime and 3D imaging) which can be used with apparatuses of the present invention, such a fact alone does not provide the suggestion or motivation necessary to make all of the modifications or combinations to reach the entirety of the apparatus of claim 31 (or any other claim herein). This rejection is thus in error and can thus be withdrawn.

CONCLUSION

The examiner failed to establish the required *prima-facie* case that the claims are not enabled under Section 112, first paragraph. Similarly, all of the claim terms are sufficiently definite to a person having ordinary skill in the art, thus satisfying Section 112, second paragraph. The examiner's obviousness rejections under Section 103 also cannot stand as the examiner failed to establish the required *prima-facie* case of obviousness. Therefore, Applicant respectfully requests withdrawal of all the rejections of claims 1-3, 5, 7, 8, 20-24, 26-28, and 30-36.

Respectfully submitted,

DAHL & OSTERLOTH, L.L.P.

By: 

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